

IRMATM *print*

User's Manual

*Digital
Communications
Associates, Inc.*





IRMA *print*™

User's Manual

*Digital
Communications
Associates, Inc.*

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Chapter 1

Introduction

Introduction

IRMAprint represents an alternative to an IBM 3287 printer by allowing you to use a non-IBM printer where you were previously forced to use a more expensive IBM-type printer. In addition, IRMAprint allows you to attach directly to the 3270 network printers with special capabilities not available from IBM (such as laser printers).

IRMAprint is compatible with all IBM 3274, 3276, and 43XX Integral terminal controllers with Type "A" adapters and operates in SNA/SDLC or BSC environments. Connected to the IBM 3270 controller with a standard coaxial cable, IRMAprint appears to the controller as an IBM 3287 printer (Model 1, 80 cps, or Model 2, 120 cps).

Features

IRMAprint offers a wide range of features. The following list provides a brief summary of each feature.

3287 Emulation

IRMAprint appears to the 3270 terminal controller as an IBM 3287 printer (Model 1 or 2 with 3274/76 attachment and 3440-character buffer). IRMAprint supports LU1 and LU3 modes, including SCS control codes. It is compatible with IBM system software supporting the IBM 3287 models listed above. No Extended Attribute Buffer (EAB) or Program Symbols (PS) options are supported.

Coaxial Interface

IRMAprint utilizes a standard native mode coaxial connection to IBM 3274, 3276, and 43XX Integral terminal controllers with Type "A" adapters. Channel-attached and remote controllers are supported in both BSC and SNA/SDLC environments.

3270/EBCDIC-To-ASCII Conversion

IRMAprint converts all standard 3270/EBCDIC characters to ASCII. Certain characters not having ASCII equivalents (e.g., the cent sign) are converted to ASCII control characters. You may designate different character conversion mappings to meet specific needs.

RS-232C Serial Interface

IRMAprint Serial uses a standard RS-232C interface to transmit ASCII data to any of a wide variety of RS-232C asynchronous devices (e.g., printers or display-only monitors).

IRMAprint's asynchronous interface supports all standard transmission rates from 45.5 thru 38,400 baud. This wide baud rate range allows compatibility with an extensive variety of asynchronous output devices, including those with very high-speed capabilities.

HEX Translation Mode

Using special control characters, *IRMAprint* converts HEX representations of ASCII codes to actual ASCII data streams. This feature is essential if you want to use ASCII output device features invoked by ASCII values not having equivalents in the IBM character set.

Menu-Driven Setup

By attaching one of the supported terminal types (3278/79 or IBM PC with an IRMA board) to *IRMAprint*'s coax port, you may access the built-in setup or "configuration" menu. The configuration menu allows you to quickly select parameters and settings appropriate for your printer. Each printer requires only a single configuration, and that configuration remains intact even during power outages or when the *IRMAprint* unit is turned OFF.

Print Test Mode

IRMAprint generates print patterns to verify communications with and correct operation of the attached printer.

Internal Self-Test

Upon power-up, *IRMAprint* executes a self-test to verify correct internal operation.

Front Panel Status Indicators

Front panel LEDs indicate whether *IRMAprint* is turned ON, is on-line, or if an error has occurred.

What To Do First

Your IRMAprint package includes two items in addition to this manual. Check to see that you have all of the following:

- The IRMAprint unit (Serial or Parallel).
- A three-foot length of coaxial cable for use in the setup, or configuration, of your IRMAprint unit.

If your package does not include all of these items, contact your IRMAprint distributor.

Next, turn to the warranty information in the Customer Support chapter. Read this important material carefully. Then fill out the product registration card and send it to DCA. This validates your IRMAprint warranty and provides DCA with a method of keeping you informed of any product updates.

About This Manual

Unless otherwise indicated, material in this manual applies to both the Serial and Parallel IRMAprint units.

This manual is divided into 3 chapters, appendices, and a Customer Support Section.

Chapter 2, “Configuring IRMAprint,” includes simple instructions for the IRMAprint configuration, or setup, procedure. It discusses in detail each field on the menu, and tells you exactly how to use the menu to configure your IRMAprint unit.

Chapter 3, “Installing IRMAprint,” guides you step-by-step through the physical installation of IRMAprint. This chapter also contains information concerning the cable you will need to connect IRMAprint to your printer.

Appendix A, “Advanced Features,” includes detailed instructions concerning the HEX convert character and multi-national character translation.

Appendix B, "Menu 2 Sample," shows a sample of the second page of the IRMA^{print} configuration menu. This menu is used only by those users requiring the advanced features discussed in Appendix A.

Appendix C, "Flow Control Support Information," contains a brief technical explanation of the flow control characteristics of IRMA^{print}.

Appendix D, "Hewlett-Packard LaserJet Support," provides information concerning the use of IRMA^{print} with the Hewlett-Packard LaserJet printer.

Appendix E, "Printer Information Checklist," contains a second copy of the checklist mentioned earlier. Instructions for using the checklist are given in Chapter 2, "Configuring IRMA^{print}."

The Customer Support Section provides important IRMA^{print} warranty and customer service information.

Chapter 2

Configuring IRMAprint

Introduction

IRMAprint's configuration process is used to set up IRMAprint to match certain communication settings, or parameters, associated with your printer. These parameters may include baud rate, parity, and others. Some parameters, such as form length and width, are dictated by your particular needs.

To configure IRMAprint, use an IBM 3278/79 terminal or an IBM PC or PC-compatible using an IRMA card. You may also use the terminal portion of an IBM 3276 controller.

Printer Information Checklist

To configure IRMAprint, you need certain information about your printer. These items are listed in the following two-page form called "Printer Information Checklist." (For users with more than one printer type or other output peripheral, an additional copy of the checklist is provided as an appendix in the back of this manual.)

Items on the checklist represent all configuration menu fields for both serial and parallel printers. Some may not apply to your printer.

All parameters and options are explained in detail in the section immediately following the checklist. Carefully review this section before completing the checklist.

Using information in the manual supplied with your printer and/or with assistance from MIS or other technical support personnel, check or enter the appropriate setting for each parameter on the following checklist:

Baud Rate (Serial Only)

- | | |
|---------------------------------|--------------------------------|
| <input type="checkbox"/> 38,400 | <input type="checkbox"/> 600 |
| <input type="checkbox"/> 19,200 | <input type="checkbox"/> 300 |
| <input type="checkbox"/> 9600 | <input type="checkbox"/> 150 |
| <input type="checkbox"/> 4800 | <input type="checkbox"/> 134.5 |
| <input type="checkbox"/> 2400 | <input type="checkbox"/> 110 |
| <input type="checkbox"/> 2000 | <input type="checkbox"/> 75 |
| <input type="checkbox"/> 1800 | <input type="checkbox"/> 50 |
| <input type="checkbox"/> 1200 | <input type="checkbox"/> 45.5 |

Data/Parity (Serial Only)

- ☐ 7 BITS/EVEN
- ☐ 7 BITS/ODD
- ☐ 7 BITS/MARK
- ☐ 7 BITS/SPACE
- ☐ 8 BITS/NONE

Auto Newline

- ☐ YES
- ☐ NO

Printer VFU

- ☐ SIMULATE
- ☐ IGNORE
- ☐ USE

Trailing Spaces

- ☐ ON
- ☐ OFF

☐ **Form Length**

- ☐ 0-999

True Scrn Print

- ☐ YES
- ☐ NO

**XON/XOFF
(Serial Only)**

- ☐ YES
- ☐ NO

EOL Character

- ☐ NL
- ☐ CRLF
- ☐ CR

Width

- ☐ 80
- ☐ 136
- ☐ 72
- ☐ 132
- ☐ 160
- ☐ INFINITE

Trailing Spaces

- ☐ ON
- ☐ OFF

Test Message

- ☐ SWITCH
- ☐ YES
- ☐ NO

Printer Type

- ☐ REGULAR

Logical Buffer

- ☐ 960
- ☐ 1920
- ☐ 2560
- ☐ 3440
- ☐ 3564

**Protocol
(Parallel Only)**

- ☐ ACK
- ☐ BUSY

Diagnostic Mode

- ☐ YES
- ☐ NO
- ☐ SWITCH

LU1 Language

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> AUS/GERMAN 1 | <input type="checkbox"/> FIN/SWED 1 |
| <input type="checkbox"/> AUS/GERMAN 2 | <input type="checkbox"/> FIN/SWED 2 |
| <input type="checkbox"/> BELGIAN | <input type="checkbox"/> FRENCH |
| <input type="checkbox"/> BRAZILIAN | <input type="checkbox"/> INTERNATIONAL |
| <input type="checkbox"/> CAN. FRENCH | <input type="checkbox"/> ITALIAN |
| <input type="checkbox"/> DAN/NORW 1 | <input type="checkbox"/> JAPANESE |
| <input type="checkbox"/> DAN/NORW 2 | <input type="checkbox"/> PORTUGUESE |
| <input type="checkbox"/> ENGLISH (UK) | <input type="checkbox"/> SPANISH 1 |
| <input type="checkbox"/> ENGLISH (US) | <input type="checkbox"/> SPANISH 2 |
| | <input type="checkbox"/> SPANISH 3 |

Menu 1 Field Descriptions (Normal Functions)

Baud Rate (Serial Only)

This field pertains to serial units only and does not appear on the parallel unit menu. Baud rate must be set to match the baud rate of your serial printer. Possible selections are:

- | | |
|----------|---------|
| ■ 38,400 | ■ 600 |
| ■ 19,200 | ■ 300 |
| ■ 9600 | ■ 150 |
| ■ 4800 | ■ 134.5 |
| ■ 2400 | ■ 110 |
| ■ 2000 | ■ 75 |
| ■ 1800 | ■ 50 |
| ■ 1200 | ■ 45.5 |

Data/Parity (Serial Only)

This field pertains to serial units only and does not appear on the parallel unit menu.

- 7 Bits/Even—7 bits character length, parity even
- 7 Bits/Odd—7 bits character length, parity odd
- 7 Bits/Mark—7 bits character length, parity mark
- 7 Bits/Space—7 bits character length, parity space
- 8 Bits/None—8 bits character length, parity none

If your printer uses ASCII codes 80H and above as printable characters (i.e., an alternate character set), the Data/Parity must be set at 8 Bits/None.

XON/XOFF (Serial Only)

- YES—Enter YES if your printer uses XON and XOFF data flow control.
- NO—Enter NO if your printer uses another method of flow control (such as CTS flow control).

EOL Character

End-of-line character. Must be set to match the requirements of your printer. Possible selections are:

- NL—Send a new line (NL) character to the output device after each logical line. NL has the value 0AH.
- CRLF—Send the two character sequence carriage return (CR) linefeed (LF) after each logical line. CR has the value 0DH and LF has the value 0AH.
- CR—Send a carriage return (CR) character to the output device after each logical line. CR has the value 0DH.

Width

This option allows you to determine the character width of the line. Used in conjunction with the next field, Auto Newline. Possible selections are:

- 80
- 136
- 72
- 132
- 160
- INFINITE

Auto Newline

Automatic new line field. Possible selections are:

- YES—Enter YES if attached device automatically does a new line at the end of a line. The end of a line is defined to be after “WIDTH” characters have been sent without carriage control.
- NO—Enter NO if attached device does not automatically do a new line after “WIDTH” characters. Since the 3287 printer does perform the new line, the IRMA^{print} must simulate this function by outputting the EOL CHAR following “width” characters.

Note that this may result in double-spaced output if the software sends an EOL as the next sequence.

Trailing Spaces

This field allows control over trailing spaces. Possible selections are:

- ON—Trailing spaces are printed just as supplied from the 3270 controller.
- OFF—Trailing spaces are truncated to allow the most efficient use of the printer.

Printer VFU

This option determines how IRMA^{print} handles a Set Vertical Format command from the host. Possible selections are:

- **Simulate**—By sending out the correct number of line feeds needed to simulate a form feed or vertical tab, IRMA^{print} simulates the printer's Vertical Forms Unit (VFU). These values may be changed by sending the Set Vertical Format command again. Top and bottom margins are also supported.
- **Ignore**—IRMA^{print} ignores the Set Vertical Format command. If the form length option is set to zero, IRMA^{print} issues a form feed character (HEX value 0C); otherwise, a form feed is simulated by the correct number of line feeds. With the setting IGNORE and form length set to zero, the printer is expected to handle all VFU operations.
- **Use**—Automatically loads the VFU of the printer specified by the Printer Type option when the Set Vertical Format command is received. If the VFU information is not available for a particular printer, IRMA^{print} enters Simulate mode. No special printers are supported at this time.

Test Message

This option indicates proper connections to the printer and is used to check the baud rate. The test message is the only method to verify that IRMA^{print} is properly connected to the printer or that a configuration setting is valid for your printer.

- **Switch**—This setting is used in conjunction with the switch, labelled "Switch," on the rear panel of the IRMA^{print} unit. When this default option is set and the switch is on, IRMA^{print} outputs the following message:

```
IRMAPRINT
SERIAL OUTPUT PRINT TEST      [or PARALLEL OUTPUT
MASTER      REV. X.XX         PRINT TEST]
SLAVE       REV. XX
```

The Quick Brown Fox... (See Figure 2-1)

The test message “The Quick Brown Fox...” repeats until the switch is released. Each time the switch is pressed, the header message too is repeated. When the switch is off, normal output is in effect.

- Yes—Fixed message is output repeatedly until the TEST MSG option is set to NO. A sample test message is shown below.

```
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
The quick brown fox jumps over the lazy dog. 01234567890!@#%&()-+=?/""
```

Figure 2-1
Sample Test Message

Do not leave the menu mode during this test.

- No—Normal output, back panel switch disabled.

Form Control

This option allows you to add form feeds where desired. Possible selections for this field are:

- None—Executes a “Print Screen” at the current printer vertical position.
- Before—Outputs a “Form Feed” prior to executing a “Print Screen.”
- After—Outputs a “Form Feed” after executing a “Print Screen.”
- Both—Outputs a “Form Feed,” executes a “Print Screen,” and then outputs another “Form Feed.”

Note that when using this option in LU3 mode, “Form Length” must be set to 0.

Protocol (Parallel Only)

This field allows you to define the “handshaking” method used for signals between IRMA^{print} and the printer. The field pertains only to parallel printers and will not appear on the serial version of the configuration menu. If you are connecting a parallel printer, the setting in this field must be consistent with the requirements of the cable used to connect IRMA^{print} with the printer. Possible field settings are:

- ACK—ACKNLG (acknowledge signal).
- BUSY—BUSY signal.

If the default setting of ACK does not produce a valid print test, use the BUSY setting.

Form Length

This option is used to control the forms length and other formatting features. The option should be set to zero unless you are in the LU1 mode using SCS control characters. In this case, any forms length up to 999 may be entered.

Any forms length may be set, but the normal default selection is 0. When set to 0, forms length is handled at the printer. If the printer does not have a forms length capability, and the user is in LU1 mode with SCS control characters, the Form Length option is used. Any form length set in the Form Length field (except the default of 0) overrides any form length set on the printer itself.

For more information concerning SCS control characters, see your technical support personnel or refer to the *IBM 3270 Information Display System 3274 Control Unit Description and Programmers Guide*.

Menu 2 Field Descriptions (Special Functions)

The following fields and their options are found on Menu 2 (see the sample illustration in Appendix B). These fields are used for special functions and advanced features, such as foreign language translations, HEX character conversions (Appendix A, "Advanced Features"), and a diagnostic mode designed for the use of DCA's technical support staff in analyzing problems with IRMAprint. You will rarely need to use Menu 2 or its fields.

Printer Type

Printer type. The only possible selection at this time is REGULAR, standard printer.

LU1 Language

This language selection field is applicable only in the LU1 mode. (For more information concerning the use of this field, see Appendix A, "Advanced Features.") Possible selections are:

AUS/GERMAN 1	Austrian/German
AUS/GERMAN 2	Austrian/German (Alternate)
BELGIAN	Belgian
BRAZILIAN	Brazilian
CAN. FRENCH	Canadian French
DAN/NORW 1	Danish/Norwegian
DAN/NORW 2	Danish/Norwegian (Alternate)
ENGLISH (UK)	English (U.K.)
ENGLISH (US)	English (U.S.)
FIN/SWED 1	Finnish/Swedish
FIN/SWED 2	Finnish/Swedish (Alternate)
FRENCH	French
INTERNATIONAL	International
ITALIAN	Italian
JAPANESE	Japanese/English
PORTUGUESE	Portuguese
SPANISH 1	Spanish
SPANISH 2	Spanish (Alternate)
SPANISH 3	Spanish-speaking

Logical Buffer

This field allows you to choose the logical buffer size appropriate for his terminal model. The field includes an option allowing support for Model 5 terminals. Possible selections include:

- 960 - Model 1
- 1920 - Model 2
- 2560 - Model 3
- 3440 - Model 4
- 3564 - Model 5

Diagnostic Mode

The options presented in this field allows you to print important diagnostic information in the event you encounter problems with the operation of your IRMA*print*. The Yes option is selected only at the request of DCA support personnel. In all other cases, the default value of No is used. Possible selections include:

- Yes—Used to produce a HEX dump. Selected only if requested by DCA technical support personnel.
- No—No diagnostic output, normal printout desired.
- Switch—This setting refers to the back panel switch discussed earlier under the Test Message heading. When set to Switch, IRMA*print* produces a HEX dump of every buffer sent down while the switch is pressed. Any subsequent buffers are printed normally.

To print an entire job in diagnostic mode, set the Diagnostic Mode option to Yes and send the job to IRMA*print*. If both the Diagnostic Mode and Test Message options are set to Switch at the same time, the test message has priority. Any job sent from the controller during a print test is held until the switch is released. The first buffer is then sent in HEX dump mode. All subsequent buffers are printed normally.

True SCRN Print

This field allows you to control the actual hard-copy output of your printer. Possible selections are:

- No—Emulates a “true” IBM 3287 printer by not printing any blank lines appearing on the screen. This means that your actual printed copy will be condensed—having no blank lines between sentences or paragraphs.
- Yes—Produces a “true” screen print, with blank lines printed as blank lines.

Beginning the Configuration Procedure

Before beginning any configuration steps, make sure you have all the items and information necessary for the procedure. You need the following:

- An IBM 3278 (Model 2, 3, or 4) or 3279 (Model 2 or 3) terminal, or a PC or compatible personal computer using an IRMA card to emulate an IBM terminal. You may also use the terminal portion of an IBM 3276 controller.
- The three-foot length of coaxial cable supplied with *IRMAprint*.
- Your “Printer Information Checklist” indicating the parameter settings you wish to set during the configuration procedure.

When you have all of these items and information, continue to the next section, ‘Bringing Up the Configuration Menu.’

Bringing Up the Configuration Menu

If you are using an IBM 3278/79 terminal, follow the steps below to bring up the configuration menu. If you are using an IBM PC or PC compatible with IRMA, skip the steps below and use the set of steps in the section titled ‘Using a PC with IRMA.’

Using a 3278/79 Terminal

STEP 1: Using the three-foot length of coax cable supplied with *IRMAprint*, attach one end to the port on *IRMAprint* labelled "Controller," and the other end to the coax port of your terminal.

STEP 2: If *IRMAprint* is ON, switch the unit OFF.

STEP 3: Turn *IRMAprint* back ON.

Following self-testing, the configuration menu is displayed. Turn to the section called 'Using the Configuration Menu.'

Using a 3276 Controller/Terminal

The IBM 3276 is both a controller and a terminal. The coax connector on the rear of this controller/display is a female connector (or plug). Since the three-foot length of coax cable supplied with your *IRMAprint* is also equipped with female connectors, users configuring with a 3276 controller must use a female-to-female adapter (or tee connector). This adapter can be obtained from your local *IRMAprint* distributor.

The coax cable attached to the rear of the 3276 controller is only eight inches long and, therefore, cannot be used for configuration purposes since the short length does not allow you to see both your *IRMAprint* unit and the 3276 display.

STEP 1: Attach one end of your coax cable to the coax connector on *IRMAprint* labelled "Controller" and the other end of the cable to your IRMA card.

STEP 2: If the *IRMAprint* is ON, switch the unit OFF.

STEP 3: Turn *IRMAprint* back ON.

Using a PC with IRMA

STEP 1: Using the three-foot length of coax cable supplied with *IRMAprint*, attach one end to the coax connector on *IRMAprint* labelled "Controller" and the other end to the coax connector of your IRMA card.

STEP 2: Boot your PC using DOS 1.1 or higher. (Since the E78 diskette supplied with IRMA is not a bootable diskette, your operating system must be booted prior to using the program. For information concerning this procedure, see your technical support personnel or refer to you IBM PC Guide to Operations.)

STEP 3: Insert your duplicate E78 diskette into the disk drive (unless you have moved the IRMA diskette contents to hard disk).

STEP 4: Enter,

A: E78

or

B: E78

or

C: E78

depending upon the disk drive (A or B) into which you inserted the duplicate diskette (with C indicating the use of a hard disk drive.)

STEP 5: If IRMAprint is ON, switch the unit OFF.

STEP 6: Turn IRMAprint back ON.

Following self-testing, the configuration menu is displayed. Continue to the section called 'Using the Configuration Menu.'

Using the Configuration Menu

You should now see the first menu page of a two-page menu, Menu 1 and Menu 2, respectively. If you do not see this menu, turn back and carefully review the section called 'Bringing Up the Configuration Menu'. If you are still unable to display the menu screen, contact DCA Customer Support.

If you are using a serial unit, your Menu 1 should look like the one illustrated in Figure 2-2 on the following page.

If you are a parallel user, your Menu 1 should look like the one illustrated in Figure 2-3, labelled "Parallel Version."

IRMAPRINT CONFIGURATION MENU
SERIAL VERSION

USE TAB KEYS TO POSITION
PRESS SPACE BAR TO CHANGE A FIELD
PRESS ATTN TO TERMINATE CONFIGURATION

BAUD RATE9600
DATA/PARITY7 BITS/EVEN
XON/XOFF.....YES
EOL CHARACTERNL
WIDTH132
AUTO NEWLINE.....NO
TRAILING SPACESOFF
PRINTER VFUSIMULATE
TEST MESSAGE.....SWITCH
FORM CONTROLNONE

ENTER VALUES IN DECIMAL

FORM LENGTH ...0

PRESS CURSR SEL FOR NEXT SCREEN

IRMAPRINT REV. X.XX MICROCODE# XX

Figure 2-2
Menu 1
Serial Version

IRMAPRINT CONFIGURATION MENU
PARALLEL VERSION

USE TAB KEYS TO POSITION
PRESS SPACE BAR TO CHANGE A FIELD
PRESS ATTN TO TERMINATE CONFIGURATION

EOL CHARACTER	NL
WIDTH	132
AUTO NEWLINE	NO
TRAILING SPACES	OFF
PRINTER VFU	SIMULATE
TEST MESSAGE	SWITCH
FORM CONTROL	NONE
PROTOCOL	ACK

ENTER VALUES IN DECIMAL

FORM LENGTH . . . 0

PRESS CURSR SEL FOR NEXT SCREEN

IRMAPRINT REV. X.XX MICROCODE = XX

Figure 2-3
Menu 1
Parallel Version

Menu 2 contains fields that concern special functions applicable to only a few IRMA^{print} users. This menu also contains a table used in the translation of HEX characters on some printers. These features are discussed in Appendix A, "Advanced Features." If you are not sure if these features concern you, consult your technical support personnel or contact DCA Customer Support. Appendix B contains a sample representation of Menu 2.

To move from Menu 1 to Menu 2, or vice versa, press the Cursr Sel key (Alt F2 on a PC with IRMA).

Each menu field may be changed to reflect the desired configuration. To change a field value, first move to the field by pressing the tab key. With each press of the tab key, the cursor moves to the next field. The back tab key may be used to move the cursor back to previous fields.

The space bar is used to change a field value. With each press of the space bar, the option in the field changes. All possible option selections are stored in the unit, and these selections are displayed in sequence. After the field is changed, the cursor may be positioned to another field.

At this time, you should have already completed your "Printer Information Checklist," indicating the configuration field values appropriate for your particular printer type. If you have not done this, turn back to the section called 'Printer Information Checklist' and complete the checklist. To properly configure IRMAprint, do the following:

- STEP 1:** Be sure that your screen is displaying Menu 1. If the menu is not shown, turn back to the section called 'Bringing Up the Configuration Menu'.
- STEP 2:** Press the forward tab key to move the cursor to the first menu field.
- STEP 3:** Look at your "Printer Information Checklist" to determine the appropriate value for that field.
- STEP 4:** If the appropriate value is not the default value shown, press the space bar until the desired value appears.
- STEP 5:** Press the forward tab key to position the cursor to the next field.
- STEP 6:** Repeat steps 3 - 5 until all field values are set according to your checklist.
- STEP 7:** When all fields are correct, press the ATTN key to terminate the configuration. The following message is displayed:

MAKE THIS CONFIGURATION PERMANENT? [Y/N]

Select "Y" (YES) if you are satisfied with the menu options you have chosen and wish those options to be saved. The values you have selected are saved and are displayed at the next power-up. Your configuration is complete, and you are ready to physically install IRMAprint. Continue to the next chapter for installation instructions.

Choose "N" (NO) if you are not satisfied with the options you have selected for all menu fields, or if you have made changes you wish to be temporary. For instance, some users may wish to frequently make temporary changes to the form length option. The configuration is saved until the unit is turned OFF. At the next power-on, the previous configuration is re-established.

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STEP 1: The
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STEP 2: The
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STEP 3: The
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STEP 4: The
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STEP 5: Press the
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STEP 6: Repeat
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STEP 7: When all
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Chapter 3

Installing IRMAprint

What You Need

At this point, you should have completed the configuration procedures. If not, turn back to chapter two and complete the steps presented there. When configuration is complete, you are ready to physically install *IRMAprint*. Check first to see that you have everything you will need to accomplish the installation. You must have the following items:

- Your *IRMAprint* unit.
- The printer or other output device to be attached to *IRMAprint*.
- The appropriate cable to connect *IRMAprint* to your printer or other output device. (See 'About Your Cables and Connections' below).
- A copy of the manual supplied with your printer. (If you have not already done so, familiarize yourself with that manual.)

About Your Cables and Connections

IBM uses coaxial cable to connect certain types of equipment such as printers and terminals to other types of equipment, such as a terminal controller. This controller is able to communicate not only with terminals, but with other devices as well, such as a printer. The controller must understand what type of device is attached by cable to its port. Therefore, *the controller cable port you will use with IRMAprint* must be “configured” to work with an IBM 3287 printer. for more information concerning this procedure, see your MIS or other technical support personnel.

Cables and Connections For Parallel Printers

To connect IRMAprint to a parallel printer, you need a cable appropriate for connection of an IBM PC to a Centronics™ parallel printer. Such a cable may be purchased at most computer supply stores.

CAUTION: DCA cautions the user that cables produced by some manufacturers may not contain all required ground wires. IBM specifications require the cable to contain eight ground wires, attached to pins 18 through 25 on the 25-pin “D” connector. if any of these ground wires are omitted, data errors may result. DCA strongly recommends the use of an appropriate cable with the required number of ground wires.

Table 3-1 illustrates the proper cable connection between IRMAprint and a Centronics parallel printer.

Table 3-1
IRMAprint Connection
to Centronics Parallel Printer

25 Pin "D" Connector Pin No.	Direction	Signal Name
1	OUT	STROBE
2	OUT	DATA BIT 0
3	OUT	DATA BIT 1
4	OUT	DATA BIT 2
5	OUT	DATA BIT 3
6	OUT	DATA BIT 4
7	OUT	DATA BIT 5
8	OUT	DATA BIT 6
9	OUT	DATA BIT 7
10	IN	ACKNOWLEDGE
11	IN	BUSY
12	IN	PE (Out of Paper)
13	IN	SELECT
14	OUT	AUTO FEED
15	IN	ERROR
16	OUT	INITIALIZE PRINTER
17	OUT	SELECT INPUT
18 - 25	---	GROUND

For information concerning the cabling requirements associated with your printer, refer to the user's manual supplied with the equipment. You may also require assistance from your technical support personnel.

When you have the proper cable for connecting to your parallel printer, turn past the following serial printer instructions to the section called 'Installing IRMAprint'.

For Serial Users Only: Your RS-232 Cable

If you are a serial printer user, IRMAprint is attached to the Serial Input of your printer using a cable called an RS-232 cable.

Each type of printer attached to IRMAprint contains an RS-232 connector with its own individual pin configuration—which may or may not match the pin configuration of the RS-232 connector of IRMAprint.

To connect IRMAprint to your serial printer, you must purchase or build an RS-232 cable with a connector that properly attaches the two equipment types. In most cases, your local IRMAprint representative will be able to provide you with the correct cable. If this is not the case, the following pages provide the necessary information to assist you in building a cable yourself, or for assisting a cable specialist in doing so.

For the cabling requirements associated with your printer, refer to the user's manual or other instructions supplied with the equipment. You may also require assistance from your technical support personnel. Appendix C contains a more technical discussion of the flow control characteristics of IRMAprint. This discussion is applicable only to printers with unusual flow control requirements.

The diagram below illustrates the proper cable connection between IRMAprint and the most commonly used printers (such as Epson FX or MX, IBM PC printer, Printronix P300, Mannesmann Tally, or Okidata).

Table 3-2
Typical Cable Configuration
for Serial Printers

IRMAprint	Printer
2	2
3	3
4	4
5	5
6	6
7	7
20	20

Table 3-3 explains the pin functions and signal direction for the cable connector configuration illustrated in Table 3-1. If your printer uses XON/XOFF flow control, the Clear to Send (CTS) and Request to Send (RTS) signals shown in Table 3-3 are not defined and need not be connected.

The information in Table 3-3 is essential to users who need to either build or purchase a properly configured RS-232 cable. If you require assistance from your IRMAprint distributor, he will need this information.

Table 3-3
Pin Functions and Signal Directions
for Building an RS-232 Cable

Printer Pin	Signal Direction at Printer	Description	IRMAprint Pins
2	OUT	Transmits to IRMAprint (TX)	2
3	IN	Receives from IRMAprint (RX)	3
4	OUT	Request to Send (RTS) To IRMAprint (Not defined with XON/XOFF)	4
5	IN	Clear to Send (CTS) from IRMAprint (Not defined with XON/XOFF)	5
6	IN	Data Set Ready (DSR) from IRMAprint	6
7	—	Signal Ground (SG)	7
20	OUT	Data Terminal Ready (DTR) to IRMAprint	20

If your printer does not assign the pin number functions shown in Table 3-3, Table 3-4 allows you to fill in the correct pin configuration from your printer to IRMAprint. Use this information to build the appropriate cable, or retain the information for your IRMAprint distributor or other cable specialist. The chart provides the information necessary to build a working cable.

Table 3-4
Fill-in Chart for Pin Configuration
From Serial Printer to IRMAprint

Printer Pin # (fill in)	Printer Signals	Signal Direction at Printer	Connect to IRMAprint's Pin
_____	Transmit to IRMAprint (TX)	OUT	2
_____	Receives from IRMAprint (RX)	IN	3
_____	Request to Send (RTS) to IRMAprint (Not defined with XON/XOFF)	OUT	4
_____	Clear to Send (CTS) from IRMAprint (Not defined with XON/XOFF)	IN	5
_____	Data Set Ready (DSR) from IRMAprint	IN	6
_____	Data Terminal Ready (DTR) to IRMAprint	OUT	20
_____	Signal Ground (SG)	—	7

Some printers are equipped with a signal similar to CTS—but with the reverse function. This function is often called PRINTER BUSY and is defined to allow data to be sent when the signal is low, and to inhibit data when high. If your printer sends a PRINTER BUSY, Table 3-5 allows you to fill in the correct cable configuration from your serial printer to IRMAprint.

Table 3-5
Fill-in Chart for Pin Configuration
of Serial Printers Using Printer Busy Signal

Printer Pin # (fill in)	Printer Signals	Signal Direction at Printer	Connect to IRMAprint's Pin
_____	Transmit to IRMAprint (TX)	OUT	2
_____	Receives from IRMAprint (RX)	IN	3
_____	Clear to Send (CTS) to IRMAprint	IN	5
_____	Data Set Ready (DSR) from IRMAprint	IN	6
_____	Data Terminal Ready (DTR) to IRMAprint	OUT	20
_____	PRINTER BUSY	OUT	25

Installing IRMAprint

You should now have the appropriate cable for the connection between your printer and IRMAprint. In addition, you should at this time be familiar with the user's manual and other literature supplied with your printer. You are ready to perform the actual physical installation of IRMAprint.

Follow the steps below:

- STEP 1:** Remove the three-foot length of coax cable from your terminal and from the IRMAprint unit. To remove the cable, simply push gently and turn each connector 1/8th turn counter-clockwise.
- STEP 2:** Turn IRMAprint OFF by pressing the power switch on the side of the unit to "0".
- STEP 3:** Assure that the coax connection of your controller is configured for an IBM 3287 printer. If you are not sure that this connection is properly configured, see your MIS or other technical support personnel.
- STEP 4:** Attach the coax cable from your controller to the coax connector on the rear panel of IRMAprint labelled "CONTROLLER."

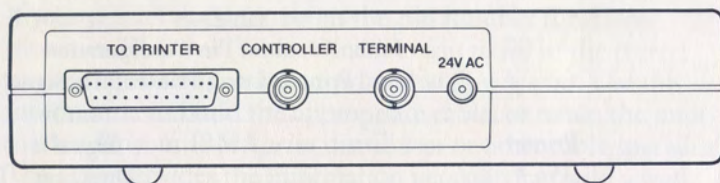


Figure 3-1
IRMAprint Rear Panel

- STEP 5:** Plug the power transformer into a standard 110VAC outlet.
- STEP 6:** Attach the cable from the power transformer to the rear panel connector of IRMAprint labelled "24VAC".
- STEP 7:** If you are connecting a serial printer, attach one end of your RS-232 cable to the rear panel of IRMAprint at the connector labelled "SERIAL PRINTER," and the other end to the Serial Input of your printer.
- STEP 8:** Turn IRMAprint ON by pressing the power switch on the side of the unit to "1".

Your IRMAprint is now both configured and installed.

Testing IRMAprint

The front panel of your IRMAprint unit contains a grouping of three small lights (red, yellow, and green looking from left to right). These lights indicate certain status conditions of the unit, including whether it is OFF or ON, off-line or on-line, and error conditions. When the IRMAprint is attached to your printer and controller and first powered on, these lights flash on one at a time (red, yellow, green), and then remain off for approximately two seconds while the unit performs certain self-testing functions.

After a few seconds, the lights assume a fixed pattern that can indicate certain conditions about the unit. For instance, if IRMAprint is properly connected to the printer and controller and is powered on and operating correctly, the following light conditions exist:

- The red light is OFF.
- The yellow light is solid ON (not blinking).
- The green light is blinking ON and OFF.

If your unit does not show this light pattern, check all connections between IRMAprint and the printer and controller, and to your power supply. If all connections are secure, but the incorrect light pattern remains, contact DCA Customer Support.

If the red light flashes, an error condition exists. In this case, turn the unit OFF and immediately back ON. If the red light continues to flash, see return and repair procedures in the Customer Support Information appendix.

Appendix A

Advanced Features

Introduction

Some printers have certain features which are invoked by ASCII codes that are not available on the IBM system. The ASCII codes are not printable by the IBM 3287 printer, or by any other printer emulating the 3287, without special programming considerations. These features may include foreign or alternate character sets, forms control characteristics, or other special functions.

Most applications do not require such special features; if you are unsure whether your application does or does not, see your MIS or other technical personnel. If your application does require these special programming characteristics, continue reading this chapter. If not, you need not read further.

HEX Convert Character

To translate these special characters into a form that can be understood by your printer, IRMA^{print} uses control characters to convert HEX representations of ASCII codes to actual ASCII data streams.

Any character may be designated as a HEX convert character by entering its HEX value (shown in Table A-1) into the "HEX CONVERT #>" field shown on the second page, Menu 2, of the IRMA^{print} configuration menu. (The default value of zero in this field disables the HEX convert feature.)

To set up the HEX convert character feature, follow these steps:

- STEP 1:** Bring up Configuration Menu 1. For instructions concerning this procedure, see Chapter 2, "Bringing Up the Configuration Menu."
- STEP 2:** Press the Cursr Sel key (ALTERNATE F2 on a PC with IRMA) to bring up Menu 2.
- STEP 3:** Press the forward tab key until the cursor is positioned at the HEX CONVERT #> field.
- STEP 4:** Enter the value of the desired HEX convert character. Although it is not the only possible choice, DCA recommends the use of convert character ¢ (cent sign, value C0).
- STEP 5:** Press the ATTN (F1 on your PC keyboard) key to terminate the configuration. Answer "Y" to the following message:

MAKE THIS CONFIGURATION PERMANENT? [Y/N]

Now that you have set up IRMA^{print} with the HEX convert character you wish to use, you must alter your program(s) or data files where the special characters are needed to include the appropriate HEX representations of ASCII values. To do this, follow these steps:

STEP 1: Using Table A-1, find the HEX representation of the ASCII values of the actual character(s) you wish to transmit. (More than one set of characters may be entered; no punctuation is required to separate entries.)

STEP 2: Alter the appropriate programs or data files to include the following:

- a. A HEX convert character to start the translation.
- b. The HEX representation (from Table A-1) of the ASCII values you wish to send.
- c. The HEX convert character to end the translation.

For example, consider using the HEX convert character `c` (cent sign) to transmit the ASCII characters "Z", "?", and `<LF>`. Table A-1 shows that the HEX representation of the ASCII character "Z" is 5A; "?" is translated as 3F; and the `<LF>` value is represented by 0A. The entry must begin and end with the HEX convert character; therefore, your program or data file would include:

`c5A3F0Ac` (ASCII HEX translation)

Your printer prints the characters "Z?" and moves to the next line. The transmission, regardless of its length, should begin and end with the HEX convert character. (In fact, any non-HEX character will turn off the HEX convert mode; DCA suggests using the same HEX convert character to begin and end the transmission.)

Table A-1
ASCII Conversion Table

DEC	OCT	HEX	CHR	DEC	OCT	HEX	CHR	DEC	OCT	HEX	CHR
0	000	00	NUL	43	053	2B	+	86	126	56	V
1	001	01	SOH	44	054	2C	,	87	127	57	W
2	002	02	STX	45	055	2D	-	88	130	58	X
3	003	03	ETX	46	056	2E	.	89	131	59	Y
4	004	04	EOT	47	057	2F	/	90	132	5A	Z
5	005	05	ENQ	48	060	30	0	91	133	5B	[
6	006	06	ACK	49	061	31	1	92	134	5C	\
7	007	07	BEL	50	062	32	2	93	135	5D]
8	010	08	BS	51	063	33	3	94	136	5E	^
9	011	09	HT	52	064	34	4	95	137	5F	_
10	012	0A	LF	53	065	35	5	96	140	60	`
11	013	0B	VT	54	066	36	6	97	141	61	a
12	014	0C	FF	55	067	37	7	98	142	62	b
13	015	0D	CR	56	070	38	8	99	143	63	c
14	016	0E	SO	57	071	39	9	100	144	64	d
15	017	0F	SI	58	072	3A	:	101	145	65	e
16	020	10	DLE	59	073	3B	;	102	146	66	f
17	021	11	DC1	60	074	3C	<	103	147	67	g
18	022	12	DC2	61	075	3D	=	104	150	68	h
19	023	13	DC3	62	076	3E	>	105	151	69	i
20	024	14	DC4	63	077	3F	?	106	152	6A	j
21	025	15	NAK	64	100	40	@	107	153	6B	k
22	026	16	SYN	65	101	41	A	108	154	6C	l
23	027	17	ETB	66	102	42	B	109	155	6D	m
24	030	18	CAN	67	103	43	C	110	156	6E	n
25	031	19	EM	68	104	44	D	111	157	6F	o
26	032	1A	SUB	69	105	45	E	112	160	70	p
27	033	1B	ESC	70	106	46	F	113	161	71	q
28	034	1C	FS	71	107	47	G	114	162	72	r
29	035	1D	GS	72	110	48	H	115	163	73	s
30	036	1E	RS	73	111	49	I	116	164	74	t
31	037	1F	US	74	112	4A	J	117	165	75	u
32	040	20	SP	75	113	4B	K	118	166	76	v
33	041	21	!	76	114	4C	L	119	167	77	w
34	042	22	"	77	115	4D	M	120	170	78	x
35	043	23	#	78	116	4E	N	121	171	79	y
36	044	24	\$	79	117	4F	O	122	172	7A	z
37	045	25	%	80	120	50	P	123	173	7B	{
38	046	26	&	81	121	51	Q	124	174	7C	|
39	047	27	'	82	122	52	R	125	175	7D	}
40	050	28	(	83	123	53	S	126	176	7E	~
41	051	29	)	84	124	54	T	127	177	7F	DEL
42	052	2A	*	85	125	55	U				

Multi-National Character Translation

Some users may wish to print characters in other than the U.S. English character set. For these users, IRMAprint's Menu 2, the second page of the configuration menu, provides a "Buffer Translate Table."

Translations In LU3 Mode

If your printer is operating in the LU3 mode and you wish to print characters other than the standard U.S. English character set, the buffer translate table allows up to 10 possible translations. The buffer translate table contains a left field (OLD) and a right field (NEW). Enter into the left (OLD) field the HEX value generated by IRMAprint for an IBM character (see Table A-2). Enter into the right (NEW) field the HEX value your printer expects (refer to your printer user's manual) for that particular character.

For example, if you wish to print the characters "§" and "é", take these steps:

STEP 1: Bring up the Configuration Menu 1. For step-by-step instructions concerning this procedure, see Chapter 2, "Bringing Up the Configuration Menu."

STEP 2: Press the Cursr Sel key (ALTERNATE F2 on a PC with IRMA) to bring up Menu 2.

STEP 3: Press the forward tab key until the cursor is positioned at the first position of the Buffer Translate Table. The Buffer Translate Table looks like this:

OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW
00	=>	00	00	00	=>	00	00

STEP 4: Refer to Table A-2 for the HEX representation of the "§" character. This HEX value is 90.

STEP 5: Enter 90 into the first position (OLD) of the translate table.

STEP 6: Refer to your printer manual to find the HEX value the printer expects for the "§" character. For purposes of our example, this expected value is 5D.

- STEP 7:** Press the tab key to move to the NEW field. Enter 5D into the NEW field of the translate table.
- STEP 8:** Move the cursor to the next OLD field of the translate table.
- STEP 9:** Referring again to Table A-2, find and enter into the OLD field the HEX representation for "é" (9D).
- STEP 10:** Move the cursor to the next NEW field and referring again to your printer manual, find and enter into the field the HEX value your printer expects for the character "é" (7B for our example).

For this translation, the Buffer Translate Table would look like this:

OLD NEW	OLD NEW	OLD NEW	OLD NEW
90 => 5D	9D => 7B	00 => 00	00 => 00

- STEP 11:** Press the ATTN key to terminate the configuration. Select "Y" when the following message is displayed:

MAKE THIS CONFIGURATION PERMANENT? [Y/N]

Translations In LU1 Mode

If your printer is operating in LU1 mode and you wish to print characters other than the standard U.S. English character set, a portion of the character table is changed according to the applicable country (see Table A-3).

In this case, you must first make a menu selection on Menu 2 in the field called LU1 LANGUAGE. [See the sample Menu 2 representation in Appendix B; for a list of possible field options, see the section in Chapter 2 called 'Menu 2 Field Descriptions (Special Functions)'. This menu selection downloads the proper characters into the character table. In addition to this menu selection, you must enter the appropriate translations into the buffer translate table. This translates your desired characters into codes able to be understood by your printer.

Let's use as an example the Epson FX-80 printer, to be set up with the German character set. Before we can begin the setup procedures, we must know what the German character set for the Epson printer looks like. The table below illustrates the character set for certain characters:

Character	Epson Expected Value
Ä	97
§	90
Ö	98
Ü	99
ä	9A
ö	9B
ü	9C
ß	91

To set up the Epson printer with the German character set:

- STEP 1:** Bring up Configuration Menu 1. For step-by-step instructions concerning this procedure, see Chapter 2, "Configuring IRMAprint."
- STEP 2:** Press the Cursr Sel key (ALTERNATE F2 on a PC with IRMA) to bring up Menu 2.
- STEP 3:** Press the forward tab key until the cursor is positioned at the field called LU1 LANGUAGE.
- STEP 4:** Refer to Chapter 2, "Fields On Menu 2 (Special Functions)" to find the correct selection for the German character set (which is AUS/GERMAN 1).
- STEP 5:** Press the space bar until the appropriate selection (AUS/GERMAN 1) is displayed in the field.
- STEP 6:** Press the forward tab key until the cursor is positioned at the first position of the Buffer Translate Table.
- STEP 7:** Refer to IRMAprint Table A-2 to find the HEX representation for the characters you wish to send. For example, the character Ä translates as 97, the character Ö as 98, and so forth.

- STEP 8:** Enter these HEX values (up to 10) into the OLD fields of the translate table.
- STEP 9:** Refer to the Epson FX-80 character table for the HEX value the printer expects for the characters you wish to send.
- STEP 10:** Enter these values into the NEW fields of the translate table.

If you wished to print the characters Ä, §, Ö, Ü, ä, ö, ü, and ß, the Buffer Translate Table would look like this:

OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW
97	=> 97	90	=> 90	98	=> 98	99	=> 99
9A	=> 9A	9B	=> 9B	A9	=> 9C	91	=> 91

- STEP 11:** Press the ATTN key to terminate the configuration. Select "Y" when the following message is displayed:

MAKE THIS CONFIGURATION PERMANENT? [Y/N]

Characters with a HEX value of 80 and above that are not sent through the translation table print either as a space or as their U.S. English equivalents. See the legend at the bottom of Table A-2 to determine which action will occur for each character.

For example, if the translate table entry 97 => 97 above was not used to translate the character "Ä", then "Ä" would print as "A".

All users who require multi-national translations should refer to the operations manual supplied with their printer to determine the proper codes for multi-national characters, and the escape sequences necessary to access the characters. The HEX convert character may be used to pass through the escape sequences to the printer.

HEX 0 0 1 2 3 4 5 6 7 8 9 A B C D E F HEX 1

0			SP	0	@	P	|	p	â	§	â	Â	¢				
1			!	1	A	Q	a	q	è	ß	á	Ã	¬				
2			"	2	B	R	b	r	ù	Æ	ô	È	|				
3			#	3	C	S	c	s	ò	æ	ó	Ê	—				
4			\$	4	D	T	d	t	ì	O	ó	Ê					
5			%	5	E	U	e	u	°	ø	ë	Ì					
6			&	6	F	V	f	v	£	“	é	Ï					
7			!	7	G	W	g	w	í	Ä	ï	Î					
8			(	8	H	X	h	x	„	Ö	î	Í					
9			)	9	I	Y	i	y	Ñ	Ü	ü	Ò					
A			*	:	J	Z	j	z	ñ	ä	û	Õ					
B			+	;	K	[	k	{	œ	ö	ú	Ô					
C			,	<	L	\	l	|	Pts	É	ÿ	Ó					
D			-	=	M	]	m	}	Å	é	Ç	Ù					
E			.	>	N	^	n	~	å	¥	Á	Û					
F			/	?	O	_	o		ç	ã	À	Ú					

☐ These characters print as a space unless they are sent through the buffer translate table.

☐ These characters print as their U.S. English counterparts (i.e. “Ä” prints as “A”) unless they are sent through the buffer translate table.

☒ “|” will print as “|” and “—” will print as “_” unless they are sent through the buffer translate table.

Table A-2
HEX Translation Table

Support of SNA Control String (SCS) Operations

SCS control codes are used to control printed page formats. They are only honored by your printer when it is operating in LU1 mode. The following describes the SCS control codes:

- Back Space (BS). The back space character (08H) is sent to the printer, and the IRMAprint internal column counter is decremented by one.
- Bell Function (BEL). The character 07H is sent to the printer.
- Carriage Return (CR). The character 0DH is sent to the printer, and the column counter is reset. If a left margin has been set, IRMAprint sends the correct number of spaces to the printer to move the head to the correct position.
- Enable Presentation (ENP). This command is ignored by IRMAprint.
- Form Feed (FF). If the Form Length menu option is set to zero, or if the Printer VFU option is set to "ignore," IRMAprint sends a 0CH character to the printer. Otherwise, IRMAprint simulates a form feed by sending the correct number of line feeds.
- Graphics Escape (GE). This command is ignored by IRMAprint.
- Horizontal Tab (HT). IRMAprint sends the correct number of spaces to the printer to reach a tab previously defined by the Set Horizontal Format command. If no tab exists to the right of the current position, only one space is sent. All tab stop information is maintained by IRMAprint.
- Inhibit Presentation (INP). This command is ignored by IRMAprint.
- Inter-Record Separator (IRS). IRMAprint sends a NL character (as defined by the EOL CHARACTER menu option) and checks for end-of-form.
- Line Feed (LF). IRMAprint moves the print position down one line by sending a NL character to the printer and then spacing over to the print position of the previous line.
- Set Attribute (SA). IRMAprint does not support Extended Attribute Characters (EAB). The parameters of this command are accepted without error and ignored.

- Set Horizontal Format (SHF). This command sets the following parameters: Maximum Presentation Position (MPP), Left Margin, Right Margin, and Horizontal Tab (HT) Settings. This command deleted all previous settings. *IRMAprint* sends spaces to simulate all horizontal positioning.
- Set Line Density (SLD). The parameters of this command are accepted without error and ignored.
- Set Vertical Format (SVF). This command sets the following parameters:
Maximum Presentation Line (form length), Top Margin, Bottom Margin, and Vertical Tab (VT) Settings. This command deletes all previous settings. If the Printer VFU option is set to "Ignore," this command is ignored; otherwise, *IRMAprint* simulates the Vertical Forms Unit operations. If the Printer VFU option is set to "Use," command strings for the printer listed in the Printer Type option are sent if available.
- Transparent (TRN). Data sent following this command are transmitted transparently (i.e., no translations are done).
- Vertical Channel Select (VCS). *IRMAprint* accepts the parameter of this command without error and does one line feed.
- Vertical Tab (VT). The print position is moved down to the next vertical tab stop setting. Vertical tab settings are set with the SVF command. If there are no vertical tab stops beyond the current print position, the VT function results in a LF. All vertical tab operations are simulated by *IRMAprint*.

Appendix B

Menu 2 Sample

Menu 2 Sample

Figure B-1 illustrates Configuration Menu 2 for both serial and parallel units. For an explanation of the fields on Menu 2, see the section called “menu 2 Field Descriptions” in Chapter 2, “Configuring IRMAprint.”

```
IRMAPRINT CONFIGURATION MENU
XXXXXXXXX VERSION
USE TAB KEYS TO POSITION
PRESS SPACE BAR TO CHANGE A FIELD
PRESS ATTN TO TERMINATE CONFIGURATION

PRINTER TYPE .....REGULAR
LU1 LANGUAGE .....ENGLISH [US]
LOGICAL BUFFER .....3440
DIAGNOSTIC MODE .....NO
TRUE SCRIN PRINT .....NO

ENTER VALUES IN HEX FOR SPECIAL BUFFER TRANSLATE CODES
HEX CONVERT CHAR. -> 00

OLD NEW      OLD NEW      OLD NEW      OLD NEW
00 -> 00      00 -> 00      00 -> 00      00 -> 00
00 -> 00      00 -> 00      00 -> 00      00 -> 00
00 -> 00      00 -> 00

PRESS CURSR SEL FOR NEXT SCREEN

IRMAPRINT REV. X.XX  MICROCODE = XX
```

Figure B-1.
Menu 2

Appendix B

Let's begin with the first example. We will use the following data to illustrate the process of finding the maximum value of a function of two variables.

Example 1

Suppose that the function $f(x, y)$ is defined by the formula

$$f(x, y) = 100 - x^2 - y^2$$

and that the domain of f is the set of all points (x, y) such that $x^2 + y^2 \leq 100$. We wish to find the maximum value of f on this domain.

First, we note that the function f is continuous on the closed disk $D = \{(x, y) : x^2 + y^2 \leq 100\}$. Therefore, by the Extreme Value Theorem, f attains its maximum value on D .

Next, we find the critical points of f in the interior of D . The partial derivatives of f are

$$f_x(x, y) = -2x \quad \text{and} \quad f_y(x, y) = -2y$$

Setting these equal to zero, we find that the only critical point of f in the interior of D is the origin $(0, 0)$.

Now, we evaluate f at the critical point $(0, 0)$ and at the points on the boundary of D . We have

$$f(0, 0) = 100$$

and, for any point (x, y) on the boundary of D , we have $x^2 + y^2 = 100$, so that

$$f(x, y) = 100 - x^2 - y^2 = 0$$

Therefore, the maximum value of f on D is 100, which occurs at the origin $(0, 0)$.

Example 2

Suppose that the function $f(x, y)$ is defined by the formula

$$f(x, y) = x^2 + y^2$$

and that the domain of f is the set of all points (x, y) such that $x^2 + y^2 \leq 100$. We wish to find the maximum value of f on this domain.

First, we note that the function f is continuous on the closed disk $D = \{(x, y) : x^2 + y^2 \leq 100\}$. Therefore, by the Extreme Value Theorem, f attains its maximum value on D .

Next, we find the critical points of f in the interior of D . The partial derivatives of f are

$$f_x(x, y) = 2x \quad \text{and} \quad f_y(x, y) = 2y$$

Setting these equal to zero, we find that the only critical point of f in the interior of D is the origin $(0, 0)$.

Appendix C

Flow Control Support Information

Flow Control

IRMA^{print} supports either hardware (RTS/CTS) or software (XON/XOFF) protocols. However, the attached peripheral must be configured for one protocol or the other, not both.

XON/XOFF Flow Control Attachment

Using XON/XOFF, the IRMA^{print} requires a bi-directional data path to the printer. In one direction, the interface sends characters to be printed. In the other, the printer sends XON and XOFF characters to the interface.

To use the XON/XOFF mode, you must enable this option during configuration. This procedure protects you from instances in which an XOFF might accidentally be generated in a CTS environment. IRMA^{print} responds to XON and XOFF in the same parity as that chosen for the data. If even parity is selected, XON and XOFF characters must also be even.

CTS Flow Control Attachment

In the CTS protocol, data going to the printer is controlled by the Clear to Send signal. When this signal is high, the interface sends data to the printer. When low, this signal inhibits the transmission of data.

The Clear to Send input on the interface is equipped with a pullup resistor which enables the transmission of data when the pin is NOT connected. This allows initial testing of the interface with the printer. If the CTS signal is temporarily disconnected, data is printed; however, if several lines or screens are printed, some data may be lost.

In the CTS configuration, no other signals need to be connected. To simulate the attachment of a modem, several printers require that certain input pins be pulled high. If this is the case, the Data Terminal Ready output and Request to Send output may be used to supply these signals. Both pins are set to a high condition as soon as the interface is powered up. No part of the IRMA^{print} operation ever causes these signal pins to be low.

Appendix D

Hewlett-Packard LaserJet Support

Introduction

This appendix provides information to users connecting the IRMAprint unit to a Hewlett-Packard LaserJet™ printer.

Configuration

Complete configuration instructions are available in Chapter 2 of this manual. If you are using IRMAprint with the HP LaserJet printer, follow the instructions in chapter 2, configuring your unit according to the settings shown on the sample menus on the following two pages.

MENU 1:

IRMAPRINT CONFIGURATION MENU
SERIAL VERSION

USE TAB KEYS TO POSITION

PRESS SPACE BAR TO CHANGE A FIELD

PRESS ATTN TO TERMINATE CONFIGURATION

BAUD RATE9600
DATA/PARITY8 BITS/NONE
XON/XOFFYES
EOL CHARACTERCRLF
WIDTH80*
AUTO NEWLINENO
TRAILING SPACESOFF
PRINTER VFUSIMULATE
TEST MESSAGENO
FORM CONTROLNONE

ENTER VALUES IN DECIMAL

FORM LENGTH ...0**

PRESS CURSR SEL FOR NEXT SCREEN

IRMAPRINT REV. X.XX MICROCODE = XX

*Portrait mode. If Landscape mode is desired, select the 132-character width option.

**See Chapter 2, "Configuring IRMAprint," for exceptions applicable in this field.

MENU 2:

IRMAPRINT CONFIGURATION MENU

SERIAL VERSION

USE TAB KEYS TO POSITION

PRESS SPACE BAR TO CHANGE A FIELD

PRESS ATTN TO TERMINATE CONFIGURATION

PRINTER TYPE REGULAR

LU1 LANGUAGE ENGLISH [US]

LOGICAL BUFFER 3440

DIAGNOSTIC MODE NO

TRUE SCRN PRINT NO

ENTER VALUES IN HEX FOR SPECIAL BUFFER TRANSLATE CODES

HEX CONVERT CHAR.—> 00

OLD NEW

00—> 00

00—> 00

00—> 00

OLD NEW

00—> 00

00—> 00

00—> 00

OLD NEW

00—> 00

00—> 00

OLD NEW

00—> 00

00—> 00

PRESS CURSR SEL FOR NEXT SCREEN

IRMAPRINT REV. X.XX MICROCODE = XX

Certain features of the LaserJet printer require the use of the Escape character in some control codes commonly called Escape Sequences. Since your IBM mainframe computer does not recognize this character, the user must choose one recognizable character to be translated to an escape character. This translation is accomplished with the buffer translate table located at the bottom of Configuration Menu 2.

In addition to the configuration settings you have already entered, this buffer translation table must contain one entry to change a selected character to an escape character. (This manual contains detailed instructions concerning the use of the buffer translation table. See Appendix A, "Advanced Features," "Multi-National Character Translation.")

Find the translation table and enter in the first left (OLD) field the HEX value generated by IRMAprint (Table A-2) for any IBM character not ordinarily used (such as the Logical Not symbol or cent sign). Enter into the right (NEW) field the HEX value your printer expects for that particular character.

For example, to translate the Logical Not symbol (usually located above the "6" character on a 3278 terminal) to an Escape character, the first line of the buffer translate table would look like this:

OLD	NEW
C1	=> 1B

Two additional examples illustrate, respectively, the translation of a cent sign to an ASCII Shift Out and a vertical bar to an ASCII Shift In:

OLD	NEW	OLD	NEW
C0	=> OE	C2	=> OF

These two latter examples are required to shift in and out of primary and secondary font modes and may or may not pertain to your application.

If you have accomplished all steps in the configuration process using the suggested settings, you are ready to use IRMAprint and your LaserJet printer.

Generating Mainframe Commands

Moving From "Portrait" To "Landscape" Mode

Moving from the Portrait to Landscape mode can be accomplished in several ways. The first and most commonly used method involves the creation of two short mainframe files. Follow these steps:

STEP 1: Create a file on the mainframe called LANDSCAPE; enter into the file only the following line:

`<LOGICAL NOT> &l10 <RETURN>`

STEP 2: Create a file on the mainframe called PORTRAIT; enter into this file only the following line:

`<LOGICAL NOT> &l00 <RETURN>`

STEP 3: To print in Landscape mode, print LANDSCAPE prior to printing any other files. This action places the printer into Landscape mode until it is instructed by the PORTRAIT file to enter the Portrait mode.

You may also move from one mode to another by first typing either the Landscape or Portrait sequence mentioned above on the screen, and then pressing the F7 key to perform a local screen print. This assumes that the LaserJet printer is assigned on the controller as the 3270 local printer.

A third method is accomplished by inserting either the Landscape or Portrait sequence at either the beginning or end of the file you wish to print. For instance, if you are in the Portrait mode and wish to print a file in Landscape mode, insert the Landscape mode sequence at the beginning of your file, and the Portrait sequence at the end of the file. In this way, the Landscape mode sequence is generated, the file is printed in Landscape mode (132-column width), and the file is returned to Portrait mode.

Using Word Processing Functions

Using the word processing features of the LaserJet printer requires only the inclusion of a command sequence immediately preceding and following the text affected by the desired feature. The following paragraphs describe the use of several of the most popular word processing features.

Underlining

The following example illustrates use of the underlining feature:

```
<LOGICAL NOT> &dD This text is  
underlined <LOGICAL NOT> &d@
```

In this example, the command sequence <LOGICAL NOT> &dD starts the underlining feature with the character immediately following; underlining continues until the <LOGICAL NOT> &d@ sequence is read.

Character Font Change

In a second example, consider another popular word processing feature, the ability to change to a different character font, such as italics. Assuming the 92286B Font Cartridge is installed in your LaserJet printer, the secondary font may be changed to italics by sending the following character string example to the printer using one of the three methods discussed previously:

```
<LOGICAL NOT> &10O <LOGICAL NOT> )0U  
<LOGICAL NOT> )s1p10vls0b5T
```

This character string sets the italics mode as your secondary character set. To then switch between the primary and secondary (italicized) set, send the following character string example:

```
<CENT SIGN> This line appears in the secondary  
italicized font <VERTICAL BAR>
```

Page Formatting

Many LaserJet users need to print 66 lines of text on an 8.5 x 11-inch sheet of paper without losing data. To accomplish this, you must create a file containing four different character strings. These character strings set four different page formatting features. The file may be created using either the printer initialization or local screen print methods described earlier. Into this file must be entered the four character strings, separated from one another by a space. The character strings must be entered in the following order:

1. <LOGICAL NOT> &l66P (Sets a page length of 66 lines)
2. <LOGICAL NOT> &l2E (Specifies a top margin of two lines)
3. <LOGICAL NOT> &l7.6C (Sets a vertical motion index of 7.6)
4. <LOGICAL NOT> l66F (Sets a text length of 66 lines)

Your line should look like this (in one line with spaces before the <LOGICAL NOT> symbols:

```
<LOGICAL NOT> &l66P <LOGICAL NOT> &l2E  
<LOGICAL NOT> &l7.6C <LOGICAL NOT> &l66F
```

When the file is printed, none of the characters in the string should be printed. If a character(s) is printed, you have entered some portion of the string incorrectly. Verify first that all letters following the ampersand are lower-case l's. Verify also that your CAPS LOCK key is not pressed and try again.

Appendix E

Printer Information Checklist

Using information in the manual supplied with your printer and/or with assistance from MIS or other technical support personnel, check or enter the appropriate setting for each parameter on the following checklist:

Baud Rate (Serial Only)

- | | |
|---------------------------------|--------------------------------|
| <input type="checkbox"/> 38,400 | <input type="checkbox"/> 600 |
| <input type="checkbox"/> 19,200 | <input type="checkbox"/> 300 |
| <input type="checkbox"/> 9600 | <input type="checkbox"/> 150 |
| <input type="checkbox"/> 4800 | <input type="checkbox"/> 134.5 |
| <input type="checkbox"/> 2400 | <input type="checkbox"/> 110 |
| <input type="checkbox"/> 2000 | <input type="checkbox"/> 75 |
| <input type="checkbox"/> 1800 | <input type="checkbox"/> 50 |
| <input type="checkbox"/> 1200 | <input type="checkbox"/> 45.5 |

Data/Parity (Serial Only)

- ☐ 7 BITS/EVEN
- ☐ 7 BITS/ODD
- ☐ 7 BITS/MARK
- ☐ 7 BITS/SPACE
- ☐ 8 BITS/NONE

Auto Newline

- ☐ YES
- ☐ NO

XON/XOFF (Serial Only)

- ☐ YES
- ☐ NO

EOL Character

- ☐ NL
- ☐ CRLF
- ☐ CR

Width

- ☐ 80
- ☐ 136
- ☐ 72
- ☐ 132
- ☐ 160
- ☐ INFINITE

Trailing Spaces

- ☐ ON
- ☐ OFF

Printer VFU

- ☐ SIMULATE
- ☐ IGNORE
- ☐ USE

Trailing Spaces

- ☐ ON
- ☐ OFF

Form Length

- ☐ 0-999

True Scrn Print

- ☐ YES
- ☐ NO

Protocol**(Parallel Only)**

- ☐ ACK
- ☐ BUSY

LU1 Language

- ☐ AUS/GERMAN 1
- ☐ AUS/GERMAN 2
- ☐ BELGIAN
- ☐ BRAZILIAN
- ☐ CAN. FRENCH
- ☐ DAN/NORW 1
- ☐ DAN/NORW 2
- ☐ ENGLISH (UK)
- ☐ ENGLISH (US)

Test Message

- ☐ SWITCH
- ☐ YES
- ☐ NO

Printer Type

- ☐ REGULAR

Logical Buffer

- ☐ 960
- ☐ 1920
- ☐ 2560
- ☐ 3440
- ☐ 3564

Diagnostic Mode

- ☐ YES
- ☐ NO
- ☐ SWITCH

- ☐ FIN/SWED 1
- ☐ FIN/SWED 2
- ☐ FRENCH
- ☐ INTERNATIONAL
- ☐ ITALIAN
- ☐ JAPANESE
- ☐ PORTUGUESE
- ☐ SPANISH 1
- ☐ SPANISH 2
- ☐ SPANISH 3

Customer Support Information

Introduction

Digital Communications Associates, Inc., makes every effort to ensure that the product you have purchased is of excellent quality in all respects. All hardware and software products have been tested and subjected to strict quality control procedures. Manuals are designed and written to provide you with complete and accurate instructions on how to use your DCA product. You are encouraged to comment on the IRMAprint manual by filling out and sending in the customer response form included in this section.

If needed, DCA Customer Support personnel are available to assist you from 8:30 a.m. to 8:30 p.m. EST at telephone number 1-800-631-4171. In Georgia, call 1-404-442-4470.

The Customer Support section includes the following information:

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The warranty provides a one year limited warranty on all DCA hardware products.

Return For Repair Procedure

This section provides instructions on returning hardware units to DCA for repair or replacement.

Statement of Copyright Restrictions

These restrictions apply to all DCA product documentation.

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Customer Response Form

This page is provided so that you can comment on the IRMAprint manual.

The following form provides space for entering IRMAprint product information. Save this form for your records.

Product Name _____

Serial Number _____

Date of Purchase _____

Place of Purchase _____

Limited Product Warranty

Digital Communications Associates, Inc. ("DCA") warrants the IRMAprint™ product hardware to be free from defects in material and workmanship under normal, proper, and intended use in its unmodified condition for one year from the date of purchase by the first End User ("Purchaser"). This warranty does not cover normal wear and tear, or damage caused by accident, negligence, vandalism, alteration, abuse, misuse, improper installation, environmental stress, or acts of God.

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Extended Warranty Services are available through DCA Customer Support.

Return For Repair Procedure Hardware Units Only

If a hardware unit proves to be defective while still under warranty, you may return it to DCA for repair or replacement. Note that proof of date of purchase must accompany all products returned for repair that are still under warranty.

Before returning any units, contact DCA's Customer Support. Customer Support will attempt to determine the cause of your difficulty. If the unit requires repair or replacement, they will provide a Return Authorization (RA) number. There will be no charge for the replacement or repair of units still under warranty.

Units no longer under warranty can be repaired or exchanged at an additional cost. An extended two-year warranty may also be purchased at additional cost. Call DCA Customer Support for further details.

The following explains the procedure for returning a unit to DCA.

1. If possible, pack the unit in its original container. If the original container is not available, wrap the unit in *Non-Static* material such as newspaper and pack it in a sturdy, cardboard container. Send only the unit. Do *NOT* send any accessories or documentation.
2. Include the following information for all units returned:

Name
Address
City, State, Zip
Telephone Number
RA #
Problem Description

3. All units should be returned by prepaid postage. *DCA Will not Accept Units Shipped C.O.D.*
4. Mail package to:

Digital Communications Associates, Inc.
Attention: RA#
1000 Alderman Parkway
Alpharetta, Georgia 30201

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Easy to understand?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detailed enough?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Too detailed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are technical terms clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the illustrations helpful?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No
Did you find any inconsistencies or errors in the instructions?	<input type="checkbox"/>	<input type="checkbox"/>

If yes, please describe:

	Yes	No
Do the instructions provide all the information needed to use the product?	<input type="checkbox"/>	<input type="checkbox"/>

If not, what additional information do you feel is needed?

NAME (optional): _____

TITLE: _____

COMPANY: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

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IMPORTANT REGISTRATION INFORMATION

Please help us keep your IRMAprint™ up-to-date by registering with us immediately! This update service is provided FREE during IRMAprint's warranty period.

Thank you.

PRODUCT REGISTRATION CARD

Please assist us in keeping your IRMAprint up-to-date by registering with us immediately! This service is provided at no charge during IRMAprint's 12 month warranty.

Contact Name: _____

Title: _____

Company: _____

Street Address: _____

City: _____ State: _____ Zip: _____

Country: _____ Telephone: _____ / _____ / _____

Serial Version ☐ Parallel Version ☐

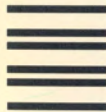
Primary Printer Used with IRMAprint: _____

Secondary Printer Used with IRMAprint: _____

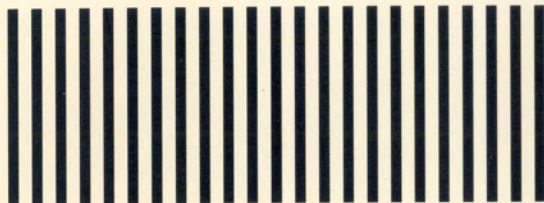
Comments: _____

IRMAprint SERIAL NUMBER: _____

Installation Date _____



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MIC-003A
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40-97914-600